Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Carriage of the Transmissions	)	CS Docket No. 98-120
Of Digital Television Broadcast Stations	)	
	)	
Amendments to Part 76	)	
Of the Commission's Rules	)	

Reply Comments of
Mitsubishi Electric America

December 21, 1998

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REPLY COMMENTS OF
MITSUBISHI ELECTRIC AMERICA

INTRODUCTION AND SUMMARY Mitsubishi Electric America ("MEA") hereby submits this reply to comments filed in response to the Commission's Notice of Proposed Rule Making in the above-captioned proceeding, which addresses cable carriage of broadcasters' digital television signals and many related issues. Our statement focuses on two areas: the importance of the recently concluded 1394 interface agreement and the need to impose regulations that prohibit material degradation of broadcaster digital signals.

In the initial phase of comments, several organizations sought to characterize the 1394 interface agreement as an imperfect and at best, interim solution, claiming that it lacks bandwidth to accomplish advanced applications and does not offer long-term solutions. As the record shows, and as we have noted in this document, industry demonstrations have proven that the 1394 interface is fully capable of processing HDTV signals of the highest bandwidth. Further, CEMA and OpenCable members collaborated to produce a standard that incorporates flexibility by accommodating changing suppliers of DTV programming while

providing consumers with pictures of the highest resolution and ease of use. Most importantly, the agreement reached on the 1394 standard removes a serious obstacle in the way of the transition to DTV and should spur further consumer acceptance of this revolutionary technology.

Various comments received by the Commission also argue that some forms of material degradation should be permitted. As a key developer of MPEG compression and decompression technology, Mitsubishi takes serious issue with claims that even minimal alteration of HDTV signals does not defraud the broadcasters and viewers that have invested substantially in the promise of digital television. A successful transition to DTV will never be achieved if consumers are left disenfranchised by a government mandate that allows cable operators the option of distorting picture images. For many, if not the majority of consumers, the incentive for purchasing a digital television will be removed if such adverse rules are written.

Section I. **THE COMMISSION PLAYED A KEY ROLE IN FACILITATING THE 1394 INTERFACE AGREEMENT.**

The Commission should be applauded for the effective way in which it inspired and facilitated the convergence of multiple stake holders toward a common set of 1394 standards that can serve the cable and consumer industries and most importantly, the American public. The Commissions' process to hold a series of meetings to illuminate the key issues and areas of disagreement was critical. With the release of these standards, both STB vendors and CE manufacturers

can now begin the process of implementing and upgrading products to allow full compatibility and interoperability.

1. THE 1394 INTERFACE IS A COMPLETE SOLUTION.

Circuit City argues[1] that since the use of the 1394 interface presupposes the MPEG decoder is inside the display, that the standard is somehow incomplete. This logic is faulty and without reason. The completeness of the standard should be judged by the fact that nothing has been left out. Mitsubishi and the voting members of the CEMA committee that passed this standard, stand behind the fact that it is complete. The EIA-775 standard adds significantly to the IEEE-1394-1995 standards by providing additional protocols, functions and features necessary and desirable to allow cable boxes to fully communicate DTV content and services to compatible televisions.

Further, while CE manufactures have a variety of implementation strategies and architecture designs, it should be noted that even the brand examples cited in the same section of the Circuit City comments (Thomson and Philips) include the MPEG decoder in the television. Regardless of the design choice, the consumer is best served when the decoder is tightly coupled and matched to the display device.

[1] See Comments of Circuit City , Page 9, Section III: "However while valuable, the 1394 interface does not appear to offer a complete solution."

If the analog component interface is used, as Circuit City (and others[2]) advocate, then the consumer will be forced to pay for two MPEG decoders, while one sits idle. Since these components remain the highest cost parts of a DTV receiver, surely it is not in the consumer's best interest to advocate duplicate hardware.

2. THE 1394 INTERFACE IS PROVEN.

Microsoft[3] claims that many technical issues of the 1394 interface including protocols need to be resolved before it can be implemented. Since Microsoft was visibly absent from the open industry standards process that resulted in the EIA-775 standard, they can be excused for this oversight. The outstanding work done by the members of the CEMA committee and the participating vendors of the OpenCable process must be commended for the thorough work in completing the standards with fully resolved protocols.

Microsoft also argues that "the 1394 connector lacks sufficient bandwidth." Again, Microsoft's lack of participation in the process indicates they are not fully apprised of the interface capabilities. As a historical note, Mitsubishi fully and successfully demonstrated the ability of the 1394 interface to handle full HDTV signals of the highest bandwidth type (1080 line) at the recent NCTA

[2] See Comments of General Instruments, Page 4
[3] See Comments of Microsoft Corporation, pages 11-12.

show in Atlanta in cooperation with Scientific Atlanta[4]. The May 1998 demonstration was attended by members of the Commission.

Microsoft maintains the capacity is inadequate for "baseband 1080i by a factor of two." When in fact, the interface has fully twice the required bandwidth. What Microsoft omits is that the interface is designed to pass the compressed MPEG bit stream, not the baseband signal. Based on our testing, the 1394 bandwidth has proven fully capable of handling even the highest bandwidth compressed signals that could fully consume the entire channel of a 256 QAM cable signals (38 Mbps), and are actually twice the capacity of broadcast 8VSB at 19.4 Mbps.

3. THE 1394 INTERFACE IS A LONG TERM SOLUTION.

Philips[5] and Thomson[6] suggest the Commission should view the 1394 interface as an interim and imperfect solution. Both say the lack of single copy protection system, "legacy receivers", and the fact that a two-piece approach is assumed will prevent the interface from being anything more than an interim solution.

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[4] See Scientific Atlanta press release at: http://www.sciatl.com/NewsRoom/NewsReleases/releases/980504-2.htm

[5] See Comments of Philips Electronics North America Corporation, Section III-B-2, page 12.
[6] See Comments of Thomson Consumer Electronics, Inc. Section IV-B, page 22.

Mitsubishi believes that the first two points can be easily resolved by market forces and the last point is a feature not a limitation. (See comments below on copy protection issues.) Mitsubishi believes that the two-piece approach where a navigation device is connected to the television by a 1394 interface is a superior design that offers the consumer the maximum possible picture performance while assuring full compatibility with the cable systems tuning and navigation system. This two-piece approach also eliminates redundant components and offers the most flexibility to accommodate changing suppliers of DTV programming including DBS, Cable and Off-air as well as storage devices including disk and tape.

Philips further states that the 1394 interface will be "eclipsed quickly by a superior approach", however there is no discussion of any such "approach" in their Comments.

The EIA-775 interface was designed with the future in mind. Both the CEMA version and the OpenCable version of this specification include multiple "profiles". The standard starts with a baseline profile and expands to support future technology through additional profiles. Even the CEMA committee has recently formed a new Work Group (WG-3) to address extended function, features and applications of the existing standard. The standard is rich, robust and extensible and will not be a static interim solution.

4. COPY PROTECTION SYSTEMS ARE UNDER CONSTRUCTION AND WILL COMPETE IN THE MARKET.

Several organizations [7] including Microsoft suggest that the 1394 solution cannot be used for "scrambled DTV" or premium programming and is only adequate for free, in-the-clear transmissions. However these comments are again not supported by the facts.

First, Microsoft[8], is referring to their own expectations of certain business decisions that might be made by content providers making this programming widely unavailable if a single copy protection system weren't deployed. These assumptions are clearly without historical basis, as it is quite likely that several of the proposed copy protection schemes can satisfy the needs of the copyright owners, coexist in the market and result in positive business decisions[9]. Further, the issue of premium content and whether it needs copy protection over the 1394 interface or not is truly outside the scope of this NPRM.

Second, such comments seem more focused on lack of full interoperability among competing brands, should multiple copy protection schemes prevail in the market. While Microsoft and the others seem to believe a market with

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[7] See Comments of Thomson Consumer Electronics, page 22; Comments of Philips Electronics North America Corporation, pages 12-13; Comments of Microsoft Corporation, pages 7-9.

[8] See Comments of Microsoft, page 8-9: "Until all of the interested standards bodies confer and coordinate copy protection at each stage of the process, the majority of non-cable-produced programming, particularly the high quality programming that consumers want most, will likely be unavailable on DTV, regardless of whether the Commission adopts must-carry rules."

[9] As an example, motion picture producers currently support DVD media with major motion picture content on either of two competing security schemes, one known as CSS used widely on standard DVDs and another known as Divx, available on a more limited basis.

competing copy protection systems is somehow undesirable, it is by no means a requirement within the scope of the Must Carry NPRM.

Third, CEMA R4.8 WG-2 has recently received five separate proposals of copy protection systems for the 1394 interface. While WG-2 is also developing the guidelines to evaluate the copy protection systems used in CE device, it is unlikely that just one system will be selected. Mitsubishi believes that the market forces are the best way to determine which copy protection system(s) will prevail.

5. INDUSTRY IS TAKING A PROACTIVE APPROACH TO ADDITIONAL TESTING OF THE 1394 INTERFACE.

The NCTA[10] suggests in its comments that the government should support additional testing of the 1394 interface standards. It is unclear if the NCTA is seeking government funding or further delay until such testing can be established. In any event, the testing will commence, regardless of government funding since these standards are being driven by voluntary industry participation.

At the November 12th meeting of the CEMA R-4.8 subcommittee, the committee established WG-4 to define interoperability verification and compliance testing of the completed EIA-775 (1394) interface standard. WG-4 has been meeting regularly since November 18, 1998 - - evidence that

voluntary cooperation in the industry processes is underway and will satisfy the requirements.

6. MARKET FORCES WILL DICTATE 1394 APPLICATION.

NAB[11] urges the Commission to take a strong role in obtaining assurances that the 1394 interface appear universally on both set-top-boxes and DTV receivers. Mitsubishi does not believe it is necessary for the Commission to require interfaces that will be made available by market forces. If consumers find value in the addition of 1394 interfaces to support connection with digital cable boxes, it is safe to assume that the market (i.e. manufacturers) will build products to satisfy this need.

While other interface solutions may not be as flexible as the 1394 interface and may require duplication of key components, the market should be free to provide these alternatives based on consumer demand. There may be hidden value to the alternative solutions that could make them attractive, therefore a regulation making 1394 a universal solution is unnecessarily restrictive.

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[10] See Comments of NCTA, page 39.
[11] See Comments of NAB, Attachment G, page 6.

Section II. STRONG RULES NEEDED TO PREVENT MATERIAL DEGRADATION ISSUES:

Owners of Mitsubishi HD-1080 series products will be denied the full benefit of this advanced technology and design that provides true High Definition pictures, if cable operators alter the signal format or signal quality when retransmitting broadcast signals. The Commission should require that broadcast DTV signals that are carried on cable systems must be sent to the consumer "as-is" without any alteration to a single MPEG packet.

7. CABLE OPERATORS SHOULD NOT BE PERMITTED TO UNILATERALLY CONVERT HD FORMATS

Adelphia & Prime et al[12] contend that as long as high definition signals are retransmitted in either 1080-I or 720-p formats, such alteration does not constitute material degradation. Mitsubishi, a key developer of both MPEG compression and decompression technology, adamantly disagrees.

First, to perform such a format transformation, full MPEG decoding and re-encoding of the signals by the cable operator is required. This unnecessary processing alone, is enough to constitute material degradation. The broadcasters who have originated the DTV signals have gone to great lengths and have invested significant sums to ensure the highest quality signal will

[12] See Comments of Adelphia Communications Corporation, ET. AL., page 31

reach their viewers. Often the quality advantage is used as a competitive edge to provide differentiation from competitors. Many broadcasters have invested in high performance Mitsubishi CODEC systems to achieve this purpose. To have their signal quality reduced by downstream decode-encode processes will deny the broadcaster the competitive advantage in which he has invested.

Second, Mitsubishi DTV receivers are equipped to identify the image format of the transmitted signal. In our receivers, detection does not require the skilled eyes of an expert observer to notice the subtle difference between one format and the other, rather only the observation of a simple, objective on-screen display indication. If the signal that reaches the consumer does not match the claims and promotion for the programs that are carried, the viewer will notice. Consumers purchasing a new Mitsubishi DTV system will rightfully expect to receive the full value from their investment. Consumer acceptance of DTV will be dealt a serious setback if the Commission allows any degradation of a program from its original format.

8. UNAUTHORIZED CABLE MODIFICATIONS TO THE BIT-STREAM OF A BROADCAST DTV SIGNAL SHOULD BE PROHIBITED.

Microsoft argues[13] that it would be premature for the Commission to prescribe anything more than the most fundamental signal quality requirements. Again, for the same reasons cited in #7 above, Mitsubishi believes that if the Commission permits unregulated manipulation of a broadcaster's bit-stream by cable operators, the success of DTV transmission and the eventual recovery of the spectrum are in jeopardy. Consumers must be able to enjoy the full benefits of HDTV products they buy, without arbitrary degradation of the signal by cable operators.

In addressing the technical issues of material degradation, the NAB[14] says:

> "The criteria for satisfactory carriage of digital broadcast signals is best characterized not by adequate subjective picture quality, but rather as reliable delivery of a packetized data stream to the consumers' DTV receivers in such a manner that the original data bits are unaltered within their packets."

Mitsubishi strongly agrees with the NAB analysis.

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[13] See Comments of Microsoft Corporation, Section IV, page 23.
[14] See Comments of NAB, Annex G, page 4.

Mitsubishi recommends that the Commission adopt rules that ensure that cable operators cannot manipulate, decode, re-encode, upconvert, downconvert, transcode or otherwise alter the bit-stream supplied by the broadcaster without a written contract granting permission by the broadcaster. As Mitsubishi stated in our original comments[15], we believe that the remodulation from VSB to QAM should be the only processing exempt from such a rule. (See item 12 below.)

9. CABLE OPERATORS SHOULD BE MANDATED TO CARRY ALL TRANSMITTED FORMATS.

Microsoft[16] suggests that any mandated carriage of particular video formats appears tenuous and may exceed the Commission's authority, yet Microsoft tries to apply statutes that were written for analog signal quality rules. This is an apparent misapplication of the statute by Microsoft, since analog signal quality requirements are clearly within the Commission's authority, yet these analog signals all fall into a single image format and performance measurements are subjective by nature, so a comparison of performance criteria is used[17]. On the other hand, DTV signals are numerical by nature and can be easily measured by objective methods and numerous image formats can be provided. Mitsubishi believes that the selection of the image

[15] See Comments of Mitsubishi Electric America, Section V, page 5.
[16] See Comments of Microsoft, page 24, footnote #43.
[17] 47 U.S.C § 534(b)(4)(A).

format itself is an essential element of image quality and is therefore within the Commission's authority to regulate.

10. OBJECTIVE MEASUREMENT CRITERIA SHOULD BE ADOPTED TO ENSURE MATERIAL DEGRADATION LIMITS .

Microsoft[18] argues that since there is no clear industry consensus identifying one image format as superior for all situations, there is, hence justification to allow modification of MPEG streams by cable operators to a degree that may constitute material degradation. Microsoft seems to suggest that since one format cannot be shown to be vastly superior to another, that it should be acceptable for cable operators to make changes downstream.

The very fact that that there is a difference of opinion among broadcasters and programmers as the selection of the most "ideal" format should be reason enough to prohibit downstream alteration. Certainly those who are charged with making these difficult format decisions have done so with careful consideration of the business and competitive impact of the decision. This judgment and selection of image format should not be negated by actions of downstream cable operators.

[18] See Comments of Microsoft, Section IV, page 24: "No signal quality requirements should be adopted..."

Mitsubishi supports the comments made by Thomson[19] that material degradation of DTV signals can be detected and measured by objective means. Since digital signals are by their nature numeric, it is certainly easier and more objective to determine degradation than in analog signals. Mitsubishi also supports the proposed language offered by Thomson[20] for such a regulation with the following changes:

> When a cable operator makes terrestrial DTV signals available to its subscribers, all such DTV signals must be in the format originally transmitted by the broadcaster, as received at the cable head end. Any alteration of a DTV signal's video format to any other format is expressly prohibited except when authorized by contract between the broadcaster and cable operator.

11. CABLE OPERATORS MUST BE REQUIRED TO ABIDE BY THE MATERIAL DEGRADATION RULES SUGGESTED ABOVE, EVEN IF THEY DON'T CARRY CABLE HDTV SIGNALS.

Paxson[21] uses the same statute[22] identified above by Microsoft to suggest

[19] See Comments of Thomson Consumer Electronics, Section III-C, page 17.
[20] See Comments of Thomson Consumer Electronics, Section III-B, page 17.
[21] See Comments of Paxson Communications Corporation, Section V-B, page 29.
[22] 47 U.S.C § 534(b)(4)(A).

that a cable operator sets a performance benchmark by any cable programming service they choose to carry and that any broadcast DTV signals must be carried at no lower than this performance threshold. Presumably if a cable operator carried signals in one of the 720 line formats, it might be permissible to downconvert 1080 line broadcast signals to that format without constituting Material Degradation. Even this limited freedom to denigrate the signal is not in the public interest nor was it likely the intent of Congress.

The choice of video formats available to broadcasters is both broad and deep. Some video formats provide higher temporal resolution sacrificing spatial resolution (1280x720x60p), others offer superior spatial resolution, while sacrificing temporal resolution (1920x1080x24p), and others offer compromises with tradeoffs for interlace (1920x1080x60i). These format choices are made with careful consideration by broadcasters and program producers based on their desire to deliver the signal best suited to the program and the intended audience. It would be wrong to suggest that downstream alterations of these careful decisions, compromising the priorities selected by the original broadcaster would be harmless. If such arbitrary alterations were permitted, consumers will be denied the opportunity to fully enjoy the programs with all the performance and quality intended by the broadcaster. The Commission must prohibit any level of unauthorized format alteration by a cable operator.

12. REMODULATION FROM VSB TO QAM SHOULD NOT BE CONSIDERED MATERIAL DEGRADATION.

Mitsubishi supports the MediaOne[23] and NAB assertions[24] that remodulation alone should be exempt from consideration as material degradation.

Mitsubishi agrees with statement made by the NAB:

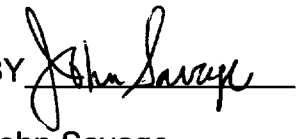
> "The exact scheme used to transport the data packets from the headend to the subscriber's house could vary between media-- cable systems may prefer to carry those data service packets via QAM modulation whereas broadcasters carry them using 8 VSB modulation-- as long as the bit stream as delivered to the subscriber's DTV receiver is unaltered from the broadcasters original bit stream."

CONCLUSION Mitsubishi Electric America appreciates the opportunity to provide its views on this matter and thanks the Commission for the role it played in facilitating industry agreement on an effective, comprehensive, and long-term 1394 interface solution. We respectfully urge the Commission to play a similarly constructive role by implementing rules that will give consumers incentive to

[23] See Comments of MediaOne Group Inc., page 12: "The conversion from VSB to QAM causes no degradation of broadcast digital video quality..."
[24] See Comments of NAB, Annex G, page 4.

purchase digital televisions by prohibiting material degradation of a broadcaster's high definition signal.

Respectfully Submitted,

BY 

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